

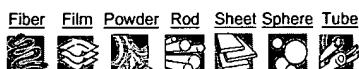


Polytetrafluoroethylene (PTFE) - Material Information

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General Description:

Common Brand names :Fluon Hostaflon TF Teflon TFE

General Description : A totally fluorinated polymer that is very frequently called Teflon®. This can cause confusion as DuPont also use this brand name for a family of related fluoropolymers. It is semi-crystalline, semi-opaque and white. It has outstanding chemical resistance being unaffected by almost all chemicals and also has a very high oxygen index (i.e. is inherently non-flam). It has a very low coefficient of friction and is stable to high temperatures. It is soft, easily deformed, very prone to creep and low in strength with poor radiation resistance. It is expensive and cannot be melt-processed (although in theory it melts at 327C, its melt viscosity is virtually infinite) and so is formed by powder sintering methods.

Industrial applications include bearings, seals, O-rings, high temperature electrical insulation, non-stick coatings and linings for vessels etc, etc. Its unusual properties make it invaluable for a wide range of laboratory applications.

Chemical Resistance

| | |
|--------------------------|------|
| Acids - concentrated | Good |
| Acids - dilute | Good |
| Alcohols | Good |
| Alkalies | Good |
| Aromatic hydrocarbons | Good |
| Greases and Oils | Good |
| Halogenated Hydrocarbons | Good |
| Halogens | Good |
| Ketones | Good |

Electrical Properties

| | |
|---|------------------------------------|
| Dielectric constant @1MHz | 2.0-2.1 |
| Dielectric strength (kV mm ⁻¹) | 50-170 |
| Dissipation factor @ 1MHz | 0.0003 - 0.0007 |
| Surface resistivity (Ohm/sq) | 10 ¹⁷ |
| Volume resistivity (Ohmcm) | 10 ¹⁸ -10 ¹⁹ |

Mechanical Properties



| | |
|--|----------------|
| Coefficient of friction | 0.05-0.2 |
| Elongation at break (%) | 400 |
| Hardness - Rockwell | D50-55 - Shore |
| Izod impact strength (J m ⁻¹) | 160 |
| Poisson's ratio | 0.46 |
| Tensile modulus (GPa) | 0.3-0.8 |
| Tensile strength (MPa) | 10-40 |

Physical Properties

| | |
|--|-----------|
| Density (g cm ⁻³) | 2.2 |
| Flammability | V0 |
| Limiting oxygen index (%) | 95 |
| Radiation resistance | Poor |
| Refractive index | 1.38 |
| Resistance to Ultra-violet | Excellent |
| Water absorption - over 24 hours (%) | 0.01 |

Thermal Properties

| | |
|--|---------|
| Coefficient of thermal expansion (x10 ⁻⁶ K ⁻¹) | 100-160 |
| Heat-deflection temperature - 0.45MPa (C) | 120 |
| Heat-deflection temperature - 1.8MPa (C) | 54 |
| Lower working temperature (C) | -260 |
| Specific heat (J K ⁻¹ kg ⁻¹) | 1000 |
| Thermal conductivity @23C (W m ⁻¹ K ⁻¹) | 0.25 |
| Upper working temperature (C) | 180-260 |

Properties for Polytetrafluoroethylene Film

| Property | Value |
|-------------------------------------|---|
| Dielectric Strength @25μm thick | kV mm ⁻¹ 160 |
| Dissipation Factor @1MHz | <0.0001 |
| Elongation at Break | % 100-400 |
| Permeability to Carbon Dioxide @25C | x10 ⁻¹³ cm ³ . cm cm ⁻² s ⁻¹ Pa ⁻¹ 7 |
| Permeability to Hydrogen @25C | x10 ⁻¹³ cm ³ . cm cm ⁻² s ⁻¹ Pa ⁻¹ 7 |
| Permeability to Nitrogen @25C | x10 ⁻¹³ cm ³ . cm cm ⁻² s ⁻¹ Pa ⁻¹ 1 |
| Permeability to Oxygen @25C | x10 ⁻¹³ cm ³ . cm cm ⁻² s ⁻¹ Pa ⁻¹ 3 |
| Permeability to Water @25C | x10 ⁻¹³ cm ³ . cm cm ⁻² s ⁻¹ Pa ⁻¹ 25? |

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Goodfellow Cambridge Limited
Ermine Business Park
HUNTINGDON
PE29 6WR
England

Goodfellow GmbH
Postfach 13 43
D-61213 Bad Nauheim
Germany
Tel: 0800 1000 579 (freecall)

Goodfellow Corporation
PA 19333-1594
237 Lancaster Avenue, Suite 252
Devon.
USA

Goodfellow SARL
229, rue Solférino
F-59000 Lille
France
Tel : 0800 917 241 (numéro vert)

Tel: 011 44 1480 424 800
or 011 44 1480 424 800
Fax: 011 44 1480 424 900
or 011 44 1480 424 900

or +44 1480 424 810
Fax: 0800 1000 580 (freecall)
or +44 1480 424 900

Tel: 1-800-821-2870 (USA and Canada)
or +1 610 688 6131
Fax: 1-800-283-2020 (USA and Canada)
or +1 610 688 4262

or +44 1480 424 813
Fax : 0800 917 313 (numéro vert)
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